

PATENT APPLICATION OF

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for

TITLE: Non-slip Dive Belt Ballast and Mold System

CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable.

BACKGROUND: FIELD OF INVENTION

This invention has two parts. Both parts deal with non-slip weights for scuba and other underwater diving activities. The first part is a mold for casting non-slip dive weights, sometimes, called ballasts. The second part is a non-slip weight or ballast that is cast from the non-slip ballast mold. The mold has the approximate shape of a ladle. Further, the mold has a main body, a handle, a gusset to reinforce the handle, and more than two protrusions within the main body.

The mold that I produced required constructing a pattern formed of wax. However, any shapeable material will suffice. Further, the pattern is placed in casting sand. The shape of the pattern remains in the casting sand once the pattern is removed. Molten aluminum is then poured into the sand cavity and the non-slip mold is created.

The only opening in the mold is in the top or upward facing position. Further, when the mold is in this position, the protrusions are visible while looking in a downward direction into the main body. The shape of the main body depends upon the sought form and/or weight of the ballast.

Molten lead is then poured into the mold. After the lead has cooled, the mold is gripped by the handle with a gloved hand and turned to an upside down position. Further, in a downward, striking motion upon a smooth solid surface, the cooled lead weight is then ejected from the mold and a non-slip dive ballast is created. The plurality of ballasts form a weight belt, worn about the waist, suitable for underwater diving activities.

## INTRODUCTION

Scuba and other underwater diving activities require extra weight to neutralize buoyancy while diving. To plan for the amount of weight necessary for this activity, the diver dons his/her diving equipment and enters the water, lake, rivers, ocean, ponds, etc., to a depth that the entire person is submerged without touching bottom. With breath fully inhaled and diver in a motionless mode, positive buoyancy should prevail ( float ). Weight is added or removed until the diver sinks as breath is exhaled. By applying this procedure correctly, there is no reason to change the amount of weights or ballasts on a belt unless there is some change or alteration to the diver's equipment or diving activities are pursued in waters of various specific gravity. Then, the only requirements are that the ballasts remain in place on the webbing or belting material, be easily adjustable for positioning on the belting material and be comfortable to wear about the waist.

When I received my Open Water Diver certification in 1988, I noticed that other students in the class were having trouble keeping the ballasts on their belts adjusted for position. Each time they removed the belt and put it back on, relocation of the weights on the belting material was required. All of the weight belts had slippage on the belting except mine.

The lead weights that I had purchased from a local dive shop, I anchored with a nail through the belting material into the lead weight. The weights remained in place but were not

adjustable, nor easily removed or replaced to compensate for changes in buoyancy requirements.

I perceived that I could design a mold to cast lead or other high density weights with a configuration that would not slip on belting material. By casting a multi slotted section into the lead weights, it would increase the belt-to-ballast resistance thereby insuring a fast ballast position on webbing material. Prior art cannot do this without the use of non lead parts, weight containers and/or multi sectioned molds which require much more effort and skill to manufacture and/or use than this invention. The cast-in-place multi slot (more than two slots) design will save the belt wearer constant adjustment of ballasts on the belting material. When weights have slipped from the desired setting, fingers are easily smashed or pinched while readjusting the weights back into position. My non-slip weights are easily added, removed or adjusted with dive gloves donned. Dive gloves are difficult to remove and don when they are wet and fingers are cold.

My non-slip ballast and mold system uses scrap aluminum for the mold, standard belt webbing, lead from prior art ballasts or other scrap lead sources and a standard quick release buckle. All materials are plentiful and readily available at reasonable cost.

#### BACKGROUND-DESCRIPTION OF PRIOR ART

I am well aware of the commercially available diving weights (ballasts) and it is my opinion that the concepts disclosed in this application are clearly dissimilar from any such commercial units. In particular, my search was directed to a type of ballast for a diver's underwater weight belt and/or the mold to cast the ballast.

The patents of interest that I found are U.S. Pat. Nos.:

2,970,448	2/61	Julio
3,039,273	6/62	Swindell
3,192,723	7/65	Apperson
3,220,197	11/65	Christiansen
3,263,432	8/66	Maskell

3,401,529	9/68	Fifield
3,648,324	3/72	Stradella et al.
3,808,824	5/74	Johnston et al.
3,851,488	3/74	
4,789,270	12/88	Selisky
4,848,965	7/89	Peterson
5,205,672	4/93	Stinton
6,146,053	11/00	Nelson

Johnston et al., (3,808,824), disclosed weights divided into two parts by a crossbar and metal clips to grip the belting. Selisky, (4,789,270), discloses a weight with a pair of belt receiving slots which require a multi part mold. Swindell, (3,039,273), shows a removable locking-slide device. Apperson, (3,192,723), indicated weights with a "u" shaped groove and Christiansen, (3,220,197), conveyed a weight secured on a belt with a pin.

My non-slip dive ballast invention not only eliminates slippage of the weight on the belting material, but eliminates use of bags, pouches, and other weight carrying containers such as are used in U.S. Pat. Nos. 5,205,672, Stinton , ( weight pack) and 6,146,053, Nelson, ( pouches). Further, my invention eliminates use of Velcro (reg.), snaps, zippers, buckles, pushbuttons, ties, pins, springs, bolts, screws, washers, straps, plates, tabs, or other parts such as are used in U.S. Pat. Nos.:

2,970,448	Julio	bolts
3,039,273	Swindell	pins and plates
3,220,197	Christiansen	pins
3,263,432	Maskell	pins and straps
3,648,324	Stradella	washers, screws and pushbuttons
3,808,824	Johnston	springs, straps and tabs
3,851,488		straps
5,205,672	Stinton	pins, straps and Velcro (reg.)
6,146,053	Nelson	Velcro (reg.) and buckles

Further, there are no cast in place parts in my invention such as threaded inserts, washers,

spring devices, pins, nor holes as seen in U.S. Pat. Nos.:

2,970,448	Julio	holes
3,039,273	Swindell	holes
3,808,824	Johnston	spring device
4,848,965	Peterson	threaded insert, holes

Further, no necessity exists for a multi part mold to cast complicated shapes such as U.S.

Pat. Nos.:

2,970,448	Julio
3,039,273	Swindell
3,192,723	Apperson
3,220,197	Christiansen
3,401,529	Fifield
3,648,324	Stradella
3,220,197	Christiansen
4,789,270	Selisky
4,848,965	Peterson

My invention eliminates the necessity to reposition ballasts on the weight belt constantly.

A brief study of the description and an inspection of the six enclosed illustrations, will confirm the advantages, correctness, simplicity and effectiveness of my non-slip mold and ballast system when compared with prior art.

FIG. 1 shows a three-dimensional view of the non-slip weight mold.

FIG. 2 indicates a three-dimensional view of the non-slip ballast.

FIG. 3 lays out a cross sectional view of the routing of the belting material through a single non-slip ballast.

FIG. 4 depicts a cross sectional view of the routing of the belting material through a plurality of non-slip ballasts.

FIG. 5 relates an overall sketch of a completely assembled non-slip weight belt viewed from the diver's side.

FIG. 6 is an overall sketch of a completely assembled non-slip weight belt as seen from the

side of the belt opposite of the diver or outside when donned.

A three-dimensional view of a non-slip aluminum mold is shown in figure 1. The mold, FIG. 1, has the approximate shape of a ladle. Further, the mold, FIG. 1, has a main body, 10, a handle, 12, a gusset, 14, to reinforce the handle, 12, and more than two protrusions, 16, within the main body, 10. The mold, FIG. 1, was produced by first constructing a pattern made of wax. However, any shapeable material will suffice. Further, the pattern was placed in casting sand. The shape of the pattern is retained in the casting sand once the pattern is removed. Molten aluminum is then poured into the sand cavity and the mold, FIG. 1, is created.

The only opening, 18, in the mold, FIG. 1, is in the top upward facing position as shown in FIG. 1. Further, when the mold, FIG. 1, is in this position, the protrusions, 16, are visible when looking in a downward direction into the main body, 10. The shape of the main body, 10, depends upon the sought shape and/or weight of the desired dive ballast. Molten lead is then poured into the mold, FIG. 1, then the handle, 12, is gripped by a gloved hand, and turned upside-down. Further, in a downward striking motion upon a smooth solid surface, the cooled lead is then ejected from the mold, FIG. 1, and a non-slip dive ballast, FIG. 2, is created.

A three-dimensional view of a non-slip weight is shown in FIG. 2. The weight or ballast, 20, is the product of the non-slip mold, FIG. 1. The shape and thickness of the ballast, 20, are such so as to attain the desired heft of the ballast, 20. Located within the ballast, 20, more than two apertures, 22, are formed which penetrate the thickness of the ballast, 20, to accommodate the route through the ballast, 20, for a belting material, 24, such as webbing. Further, the belting material, 24, is woven through the apertures, 22, within the weight (ballast), 20. This procedure causes satisfactory resistance between the ballast, 20, and the belting material, 24, to insure a non-slip condition. A cross sectional drawing indicating the route of the belting material, 24, through the ballast, 20, is shown along line 3-3 in FIG. 3 from 3-3 of FIG. 5. Further, the ballast, 20, can be stacked and the belting material, 24, woven through a plurality of ballasts, 20, in a single location as shown along line 4-4 of FIG. 4 from 4-4 of FIG. 6 to increase or decrease the desired weight in that location on the belting

material, 24. A completely assembled diver's weight belt is illustrated in FIG. 5. This drawing shows the diver's side of a plurality of ballasts, 20, woven on a belting material, 24, with a type of quick release buckle, 26, installed. Further, FIG. 6 depicts the side of a web woven plurality of ballasts, 20, and a type of quick release buckle, 26, that is opposite or away from the diver.

It is my opinion as the inventor that the advantages listed for my non-slip ballast mold FIG. 1, for producing non-slip ballasts, 20, which are used to control buoyancy in underwater diving activities, do not appear in prior art. The design of this mold/ballast system as disclosed and illustrated herein provides a definite and unique separation from prior art.

## RAMIFICATIONS

Any route or passageway through and/or alongside and/or around a ballast material with a belting material used as a weight belt, to form enough resistance between the ballast material and the belting material to cause the ballast material to maintain its placed position on the belting material. The ballast must be easily adjustable, easily removed and/or replaced on the belting material, be comfortable to wear and avoid use of non lead materials except for the ballasts, belting, and a quick release buckle.

## OBJECTS AND ADVANTAGES

Prior art does the basic job of a weight belt, which is to neutralize buoyancy. However, it is also important to do this in as simple, basic, user friendly, efficient, and inexpensive method as possible like this invention. The time spent fiddling with unnecessary frills and do-dads and keeping track of loose parts and complicated devices can be better maximized on underwater diving activities.